European Research Studies Journal
Volume XX, Issue 4B, 2017

pp. 412-420

Operational Management of Enterprise Structures in the Sphere of Education and Science: Problems and Methods for their Solution

Alexander A. Galushkin[1,2]

Abstract:

In the present article the author examines the practices and problems of information and communication technologies (including the Internet) to improve the organization and management of educational institutions of higher education and research institutions in the Russian Federation at the present stage of information-communication technologies implementation for optimization of scientific, educational and administrative processes.

During the study, the author examines the functionality of various software and hardware complexes of Russian and foreign production. Attention is paid to software products from Microsoft and of Sun, however, without neglecting products, developed by the Russian software companies. During the study, the author draws attention to the specific features of the structure of the major educational institutions of higher education and scientific organizations in the Russian Federation.

It is noted, that in view of significant geographical remoteness (and not only in one subject of the Russian Federation, but also a variety of subjects of Russian Federation, which are often located in different federal districts) of different structural units of the introduction of information and communication technologies can not only speed up the process, but also significantly save costs and increase control. In the conclusion the author presents five scientifically proven points.

Keywords: *information technology, software, Internet, network, management, problems, problem solving software, equipment, education, effects, safety, Russia, Russian Federation.*

JEL Classification: *M21, I20, I2*

[1] *Russian University of Transport, E-mail: alexander.galushkin@yandex.ru*
[2] *Stolypin International Institute of Informatization and Public Administration, E-mail: alexander.galushkin@yandex.ru*

1. Introduction

After the collapse of the Soviet Union and the emergence of hotbeds of ethno-political and regional conflicts, political instability (Grebennikov *et al.,* 2013; Borovin *et al.,* 2015) in Russia, for the mass use personal computers of different manufacturers appeared an active development of information and communication technology (ICT) started. Since 2000s, computers have become a part of everyday life (including work) of most of the population, even decisions of courts became published in special sites in the Internet (Sangadzhiev *et al.,* 2013; Dzhukha *et al.,* 2017; Kuznetsova *et al.,* 2017; Vovchenko *et al.,* 2017). Not exception is the system of higher education and science, where also a variety of ICT were implemented.

At the same time, developers are not limited in the methods of implementation of the information environment of educational institution of higher education (including e-education environment). As Kryukov and Shahgeldyan (2004) pointed out the implementation of such system is the modeling of the integrated information system based, on web-service technology (Sazhin and Saraikin, 2016; Pena-Miguel *et al.,* 2017; Liapis *et al.,* 2013).

The current practice shows, that the most user-friendly is the organization of access via a secure http protocol or safe https protocol, although at the same time the data rate falls. Moreover, for efficient operation of the system a network of interrelated subsystems can be used. They would conduct receipt, processing, storage, modification, interpretation, the issuance of the necessary data. In the case of the number of subsystems operating together, additions of new features may require creating a new revision of a separate subsystem. To streamline the process of creating the information environment of the educational organization of higher education it is necessary to minimize the inappropriate costs, develop and adopt a corresponding concept. It should be noted, that the development of the information environment, considering the accepted concept, should include all aspects of information systems in educational organizations of higher education, determine which resources are required to contact development and incorporation of the computerized educational environment (Baldacchino *et al.,* 2017).

Of course, the above prerequisites for the creation of specialized software and hardware systems for the needs of educational institutions of higher education have led to developments either on the domestic or on the global market. Let us consider some interesting developments on the subject from leading software vendors.

2. Materials and Methods

In this article the author presents unique research results. For this research the author formulated problem, accumulated the sources base for the conducted research and proposes reliable solutions. During the research the author used the following

research methods: qualitative, meta-analysis, logical, case studies, participant and non-participant observation.
During the sources base accumulation, the author collected and studied scientific and practical materials in different languages: English, German, Italian, Russian. The present article may be useful to the scientist conducting research on efficiency of educational and scientific institutions, quality of education, post-soviet development of Russia, as well as the practitioners in the field of science and education.

3. Results

As many know, Microsoft has firmly taken a leading global position in the production of software. Of course, it could not ignore the sector of integrated enterprise management systems, developing Microsoft Business Solutions - Axapta, which is currently one of the most powerful in the world, which allows you to automate almost all aspects of the organization (including educational institution of higher education). In one of the largest domestic IT-companies "KROK" they note (The Solution of Microsoft Business Solutions Axapta, 2009) that Microsoft Business Solutions - Axapta has a modular structure for the activity of the modern educational institution of higher education, including strategic management and financial management, management of various aspects of the relationship with the students, staff management, project management and much more.

It is important to note, that the advantages of reporting software sufficiently fit into the requirements for the information environment of educational institutions of secondary level of higher education, without creating a complete educational environment. As the company "KROK" (The Solution of Microsoft Business Solutions Axapta, 2009) notes, there are a lot of software features available in the information environment for the process management, including the ability to work through the http protocol, the ability to manage and configure the system via LAN and remote access to means, the possibility of a quick setup, professional technical support.

By the means, provided in modern software product, educational organization of the higher education can promptly and cost-effectively comply with the requirements of the current legislation, as well as to adapt to the modern market requirements. This is very important, because "Russia is moving steadily towards improving mechanisms for ensuring children's rights", "today Russia is facing an acute problem of protecting the rights of children" (Abashidze *et al.*, 2015).

It is also important that all the analyzed software solutions may be connected to the Internet. The software solution from Microsoft is compatible with any software products running on Microsoft Windows operating system. "Alliance Media" News Agency points out (Microsoft Business Solutions-Axapta is Expanding its Capabilities, 2009), that the fifth package updates of Microsoft Business Solutions - Axapta includes several additional functions. Among other things, it provides the

function for bookkeeping and preparation of financial statements under the tax laws of the Russian Federation. Integration of financial statements is made available in the localized version for Russian, which contains a powerful tool for bookkeeping (specialized for the educational institution of higher education) and is extremely useful in modern conditions of the multi-channel financing.

It is extremely important, that the reporting software may be installed on different computers, when they are combined into a single network, it allows working with a large amount of data. That system scalability combined with high functionality and low total cost of ownership (TCO) makes Microsoft Axapta an attractive solution for large companies (Martynov, 2002; Gorina, 2016).

In general, analyzed software product is a complete system, that allows automate main tasks of the higher education institution (management of the educational process, finance and development of new technologies, areas management and training plans, management of relationships with the students, the management of teaching staff, administrative and technical mobile and educational support staff). "The broad functionality, flexibility and scalability solutions allow one to implement the most complex control tasks. Microsoft Axapta – is a reliable business process management tools in the frames of the single information space" (Microsoft Business Solutions-Axapta, 2008). However, we should not forget that the introduction of such a powerful system requires considerable adaptation of educational processes in the organization of higher education, staff training, to overcome the inertia of thinking of employees. Also, it is important not to forget about the essential cons of this system, so not every educational organization of higher education can afford it.

Also, interesting is the development of Cosinus from the Sun company. It uses the above-mentioned model of the information environment in the web-based services, simplifying its deployment and reduces implementation costs, as the web browser is built right now in any operating system. The analyzed program product as well as the previous one consists of various modules integrated into the overall system. COSINUS.PORTAL – is a portal solution for educational organizations of higher education, based on the Sun Java Enterprise System. The software solution includes a virtual office, including mail, calendar, address book, an information system capable of operating group, and much more (COS & HT. COSINUS - University Management System, 2009).

The adapted decision also contains a module for working with content site on the Internet and internal resources for placement of materials in the public domain. It may be in the curricula, educational complexes, tasks for the current and intermediate control, examinations, and tests.

Also, the developer notes, (COS & HT. COSINUS - University Management System, 2009) that by means of COSINUS.ABITUR subsystem in educational

institution of higher education the whole cycle to recruit prospective students can be provided, including their registration, preparation of draft orders and agreements on training, maintain the data base of students, the creation of certification statements and performing other functions.

Through COSINUS.EDUMAN (COS & HT. COSINUS - University Management System, 2009) can be provided job training of the educational institution of higher education, including the possibility of the curriculum formation, the calculation of lecture hours, user friendly printing of documents.

Through COSINUS.STUDENTS (COS & HT. COSINUS - University Management System, 2009) can be provided work units to work with students. There are record-keeping cards and personal affairs of students, preparation of individual statements, preparation of orders for major projects of orders, preparation of protocols of state certifying commission, preparation of summary of test results, and even preparation for printing of diplomas texts. Above software allows one to customize the look of standard documents in an educational institution of higher education. For convenience, in accordance with international standards end-to-end bar coding is ensured. The system provides workflow diagram, which can be a standardized (from the dean's office to the rector) or individualized (defined by the organization individually). In addition to these important functions, it is impossible not to draw attention to a very important in modern conditions point. This is a function for accounting the fact of payment for training of a person, including payments made on a regular basis.

Thus, deployment of such system in the educational organization of higher education is possible with the acquisition of an additional server to the industrial base and would not require the installation of separate programs for users that will access the database through the web-interface. Also of note is the system focus on the ongoing management of the educational institution of higher education, allowing thoroughly work through this process, but leaves aside the question of funding and the adoption of global solutions.

The developments of the domestic company "1C" are traditionally oriented to the financial orientation. There is nothing surprising in the fact, that the software for educational institutions of higher education in their performance, in fact, it is primarily a bookkeeping. So, they developed "1C: Enterprise 7.7. Set accounting educational institution" (1C: Enterprise 7.7. Set for the Accounting of the Educational Institution, 2005), which is a software solution to meet the accounting needs in the educational organization of higher education, by which all accounting processes are automated, including the calculation of payments to staff and students, the processing of payments received from students enrolled on a contractual basis, and many others. With the help of available software solution functions, jobs for different categories of accounting and human resources staff can be arranged, if necessary.

It is important to note, that it is a domestic product, developed by a reputable company with a name. No wonder, to the customer support of the product special attention is given. Importantly, in contrast to many foreign developers, support for which is not carried out in Russian, "1C" provides support for users of its software not only on the high level, but also in Russian language. Registered users can get support by telephone and email. To register it is necessary to fill out the registration form and send it to the company "1C" or go to the partner-franchisor (1C: Enterprise 7.7. Set for the Accounting of the Educational Institution, 2005). In addition, "1C", to support the users of their products, produces textbooks and other instructional materials.

However, the development of the "1C" company in this area is not limited to programs of solving mainly the accounting tasks. Designed configuration "1C: Chronograph contingent for the management of education" (1C: Chronograph Contingent for the Management of Education (Ed. 2.5) - The Configuration for Managing and Accounting Data on Pupils at the Level of Education Administration, 2006) allows the rapid registration of personnel and their movement in educational institutions of higher education. The system is significantly modified for the educational institutions of higher education needs. So, the ability to implement the work of different users, data and periodization of their selection in a certain period, disciplines, students, formation of reporting documentation, as well as a number of other functions.

Unfortunately, such software solutions by "1C", despite the automation of certain tasks, still do not allow one to create a centralized integrated information environment of educational institution of higher education. However, developments in this direction are carried out, and, most likely, in the future the company, armed with knowledge of the specifics of Russian education, will be able to offer such a comprehensive product.

Recently in Russia many educational institutions started to provide tests for migrants (though on different levels). "At present, there are several types of educational tests for migrants" (Kiseleva and Kazhaeva, 2015; Ilina *et al.*, 2017). Therefor it is required the implementation and the development of new software and ICS in general as soon as possible.

4. Discussion

We should not forget that all analyzed systems cannot be deployed in the educational organization of higher education immediately, because effective implementation of the management system is also very difficult. It seems that the most customized products are being implemented in the field of distance education. With the introduction of information products in the deeper stages of educational organization of higher education, usually, it is facing many serious difficulties.

The first and the main difficulty, of course, is the financial one. Not only software itself cost money, the cost of the necessary equipment and the other related software often outweigh the costs many times over. It is necessary to pay attention to the fact, that geographically the majority of educational institutions of higher education are located at various locations within a single region of the Russian Federation, and sometimes in different regions.

In addition, although this is not a problem in conditions of the quality Internet, coverage, however, it involves many expenses, such as the purchase and support of software and equipment, and connection the channels of communication, payroll of specialists to support the operation of all systems. Large educational institutions of higher education often deploy own telecommunication networks and even create a dedicated server rooms in their buildings.

Creation of the distributed system requires purchase of the large number of equipment, as well as different software for their effective work. Such expenditure can be estimated in the hundreds of thousands of dollars, that can have very big for the budget of the educational institutions of higher education and/or science, of even be too much for budgets of many educational and/or research institutions.

It is well known that "the right to education is guaranteed to everyone" (Semenova and Kiseleva, 2015), appropriate ICS may not only limit costs and systemize documentation of the educational and/or scientific institution, but also provide chances for opening new campuses instead of separate branches of educational institutions (which was previously very common for Russian Federation).

5. Conclusion

As a result, it seems necessary to make the following conclusions:

1. Some manifestations of the crisis, caused by the transition from the Soviet planned state control to a market economy, which has affected all areas of the country, made the educational institutions of higher education to operate on competitive grounds. The search for new sources of funding, in addition to the significant increase in problems solved by the top management of educational institutions of higher education, what makes new information technologies introduction an important for the appropriate functioning of the educational organization of higher education.

2. The functional approach that was applied to the management of educational institutions of higher education in the Soviet period gone away. It was replaced by proposed process-stream approach to the management of the educational institution of higher education, which considers all educational institutions as a process and allows to solve its tasks.

3. The multi-channel financing of educational organization of higher education not only leads to an increase in financial flows, but also a sharp rise in the financial statements. Often, even a specialized accounting software is not able to meet the specific requirements of the educational organization of higher education present conditions of their work, and therefore requires a comprehensive system capable of automating a decision, and financial issues in the complex.

4. The results of the automated analysis of educational institutions of higher education management systems allow us to conclude, that a good software solution for automating the management of the educational institution of higher education is COSINUS system from SUN Microsystems, as it has sufficient ease of deployment and functionality, while its implementation does not require such high costs as a powerful business management system from Microsoft and the developers of other software products.

5. The management system currently in operation in a large part of the educational institutions of higher education is largely conservative (top-heavy structure) and did not yet got rid of the remnants of the planned economy of the Soviet era, leading to the fact that, despite the legally declared principle of collegial management, all power strategic decision-making as well as the responsibility for implementation rests with the single person (usually the rector), who is not always able to most effectively deal with the increasing volume of the challenges posed by the emergence of market relations in the education system and multi-channel financing.

References:

1C: Chronograph Contingent for the Management of Education (Ed. 2.5) - The Configuration for Managing and Accounting Data on Pupils at the Level of Education Administration, 2006. Information for Users and Partners 1C. Information Bulletin. No. 5935.

1C: Enterprise 7.7. Set for the Accounting of the Educational Institution, 2005. Information for Users and Partners 1C. Information Bulletin. No. 4254. Date View October 27, 2017 http://www.1c.ru/news/info.jsp?id=4254

Abashidze, A., Gugunskiy, D., Koneva, A., Simonova, M., Solntsev, A., 2015. Current Problems of Interstate Cooperation of Russian Federation for the Protection of Children in Case of Disputes Between Parents Living in Different States. Asian Social Science, 11(14), 337-342.

Abashidze, A., Gugunskiy, D., Koneva, A., Solntsev, A. and Grigorieva, N., 2015. Current Issues of Application of Hague Child Protection Convention of 1996 on National Level. Mediterranean Journal of Social Sciences, 6(4S4), 289-298.

Baldacchino, J.P., Caruana, R., Grima, S., and Bezzina, H.F. 2017. Selected Behavioral Factors in Client-Initiated Auditor Changes: The Client-Auditor Perspectives. European Research Studies Journal, 20(2A), 16-47.

Borovin, Y.M., Krylova, V.E. and Shlyapin, D.A. 2015. Experience of Universities in Practice-Oriented Training Personnel for High-Tech Enterprises. European Research Studies Journal, 18(4), 171-177.

COS & HT. COSINUS - University Management System, 2009. Sun Microsystems. Date View October 27, 2017 http://ru.sun.com/solutions/COSinus.html

Dzhukha, M.V., Kokin, N.A., Li, S.A., Sinyuk, Yu.T. 2017. Research and Development Intensity in Business: Russia and EU. European Research Studies Journal, 20(1), 64-76.

Gorina, A.P. 2016. Issues and Prospectives of the Educational Service Market Modernization. European Research Studies Journal, 19(3) Part B, 227-238.

Grebennikov, V.V., Marchuk, N.N. and Galushkin, A.A. 2013. Organizational and Legal Bases of the Nationality Institute and its Place in the System of Rights in Russia. World Applied Sciences Journal, 23(9), 1217.

Ilina, I., Kryukova, E., Potekhina, E., Abyzova, E. and Shadskaja, I. 2017. Russian Lectures at the Crossroads of Reforms: Strategies of Survival and Adaptation. European Research Studies Journal, 20(2B), 86-97.

Kiseleva, E.V. and Kazhaeva, O.S., 2015. Russia Introduces Integration Examination for Migrants: Some Legal Aspects. Review of European Studies, 7(3), 15.

Kryukov, V.V. and Shahgeldyan, K.I., 2004. Typical Organizational and Technological Solutions for the Creation of a Regional Information Environment of Higher School and Branch. Open Education, 5, 38-52.

Kuznetsova, V.E., Bogataya, N.I., Khakhonova, N.N., Katerinin, P.S. 2017. Methodology of Building up the Accounting and Analytical Management Support for Organizations in Russia. European Research Studies Journal, 20(1), 257-266.

Liapis, K., Rovolis, A., Galanos, C. and Thalassinos, I.E. 2013. The Clusters of Economic Similarities between EU Countries: A View Under Recent Financial and Debt Crisis. European Research Studies Journal, 16(1), 41-66.

Martynov, V. 2002. We Come to the Civilized Market. CIO, 9, 3.

Microsoft Business Solutions-Axapta is Expanding its Capabilities, 2009. Alliance Media. Date View October 27, 2017 http://www.allmedia.ru/newsitem.asp?id=692767

Microsoft Business Solutions-Axapta, 2008. Corporate solutions. Date View October 27, 2017 http://www.it-solutions.ru/cgi-bin/index.pl?p=42

Peña-Miguel, N., Corral-Lage, J., De La Peña Esteban, I.J. 2017. A First Approach to a Public Financial Information System for Social Benefits. European Research Studies Journal, 20(2), 109-127.

Sangadzhiev, B.V., Marchuk, N.N., Galushkin, A.A. 2013. Courts of General Jurisdiction in Russian Federation as an Instrument of Human Rights and Freedoms Protection. World Applied Sciences Journal, 26(5), 689.

Sazhin, Y.V. and Saraikin, V.Y. 2016. Social Expectations and Satisfaction with Professional Activity of Pedagogical Personnel of Research University (evidence from the State University of Mordovia). European Research Studies Journal, 19(3B), 258-272.

Semenova, N.S., Kiseleva, E.V. 2015. Ban on the Hijab at School: Human Rights Against Migration Background. Mediterranean Journal of Social Sciences, 6(4S1), 514.

The Solution of Microsoft Business Solutions Axapta, 2009. CRIC. Date View October 27, 2017 http://www.croc.ru/solution/solution_84.shtm

Vovchenko, G.N., Tishchenko, N.E., Epifanova, V.T., Gontmacher, B.M. 2017. Electronic Currency: The Potential Risks to National Security and Methods to Minimize Them. European Research Studies Journal, 20(1), 36-48.